Trend Study 17-56-05

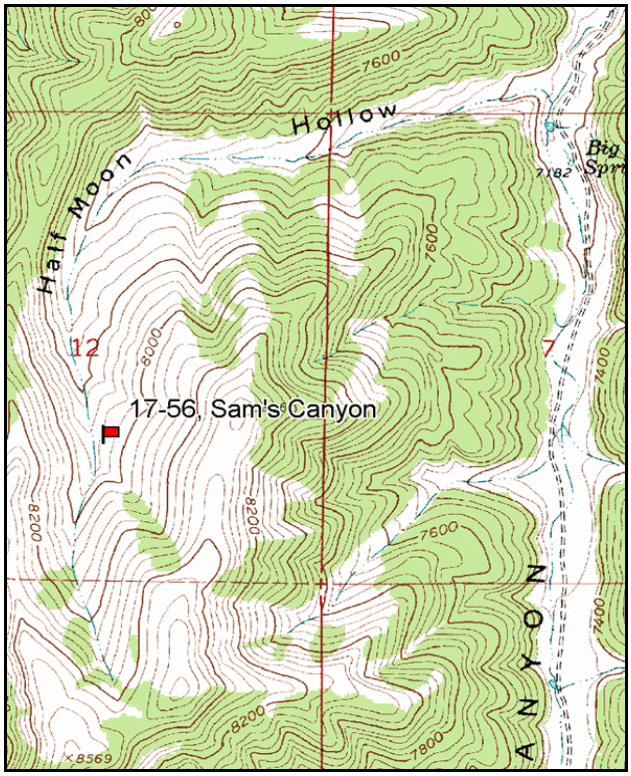
Study site name: Sam's Canyon . Vegetation type: Mountain Brush .

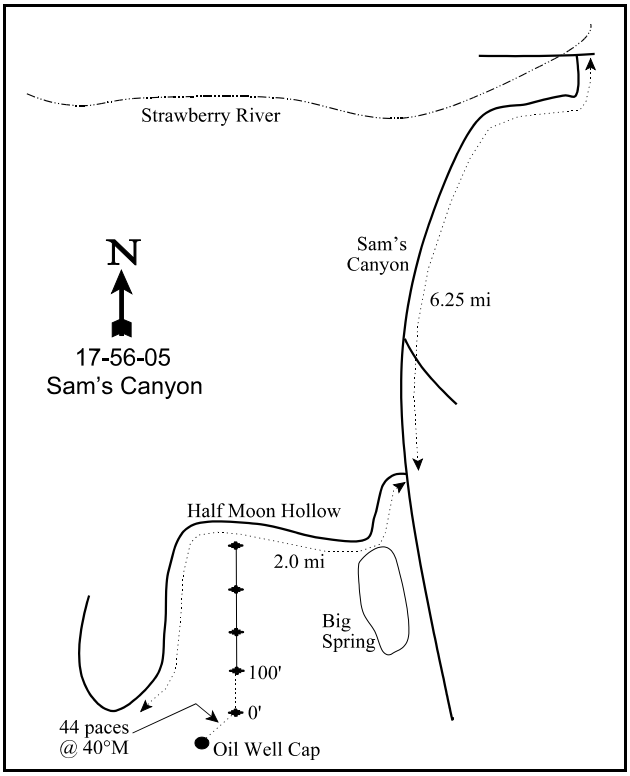
Compass bearing: frequency baseline 0 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of the Strawberry River Road and U.S. 40 near Starvation Reservoir, go west up the Strawberry River for 8.5 miles. Before the bridge, turn left. From the Strawberry River Road, go 6.25 miles up Sam's Canyon. Turn right into Half Moon Hollow (about 0.2 miles before Big Spring). Follow the old, rabbitbrush-covered road (which may be impassable to vehicles due to washouts and tall brush) about 2 miles up the canyon to when the road turns sharply right and goes up a dugway. The old drilling platform there is hardly noticeable, just a brush-covered flat spot in the bottom of the canyon. The well cap is 15" tall. From the capped well, the 0-foot baseline stake (marked with browse tag #7080) is 44 paces bearing 40°. The baseline runs north across the slope. The first density plot is located a few paces north of the 100-foot baseline stake.





Map Name: Sam's Canyon

Diagrammatic Sketch

Township 5S Range 8W , Section 12

GPS: NAD 27, UTM 12T 4434014 N, 522920 E

DISCUSSION

Sam's Canyon - Trend Study No. 17-56

The Sam's Canyon study is located at the head of Half Moon Hollow, a tributary of Sam's Canyon. The study is within Ute Indian Reservation lands. The range type is intermediate between black sagebrush and mixed mountain brush. The elevation is relatively high at 7,900 feet, but is on an exposed western slope of about 35%, so winter snow usually does not accumulate. This site was not read in 2000 because the access road was washed out. In 1995, deer pellet frequency was higher than in 2005. Elk frequencies were very low in 1995, but appeared be higher in 2005. Pellet group data from 2005 were estimated at 48 elk, 27 deer, and 7 cow days use/acre (119 edu, 68 ddu/ha, and 16 cdu/ha). Cow use was from last season.

Soils are limestone derived and very rocky on the surface. Subsurface soil tends to be unconsolidated with a high clay content. Soils are shallow and average 13 inches, although they were measured at 21 inches in some places. Very little organic matter is present. Most of the finer surface soil particles have long since been eroded away. Erosion-exposed pavement and rock cover a considerable amount of the ground surface.

Several species of browse offer forage for wildlife but true mountain mahogany would be considered the key browse species. Mahogany is in good condition with respect to age structure and vigor. The average mature shrub measures only 2.5 feet in height and is all available. Utilization has been extremely heavy in the past, with the exception of 1995 when the majority of individuals were moderately browsed. Vigor is good and no decadent plants were encountered previous to 2005. Reproductive potential and the proportion of young plants in the population stabilized around 15% young and 3% dying, despite the seemingly large decline in young numbers from 1988 to 1995. The large number of young plants and reduced number of mature plants sampled in 1988 appears to be a classification problem and not a major shift in age structure.

Secondary browse species include: serviceberry, black sagebrush, and a small number of mountain big sagebrush. Mature serviceberry average about 3 feet in height and all of it is considered available to wildlife. These shrubs have been heavily utilized in the past, but now exhibit mostly light hedging. Vigor was good (3% or less with poor vigor) and percent decadency was low at 8%. A moderately dense stand of black sagebrush occupies the site, but both Black sagebrush and mountain big sagebrush have decreased with previous drought conditions. Black sagebrush cover averaged 11% in 1995 and decreased to 4% in 2005. Density has been decreasing since 1988. Its density estimated at 4,220 plants/acre in 1995 then decreased to 2,680 in 2005. Decadence was high in 1988 and 2005 at 41%, but was low in 1995 at 12%. The plants classified as dying increased from 5% in 1995 to 32% in 2005. Mountain big sagebrush density decreased from 599 plants/acre in 1988 to 180 in 1995. Since 1995, mountain big sagebrush has increased to 320 plants/acre. In 2005, decadence was high at 63% with 38% of the population classified as dying. Use was moderate to heavy in 2005.

The herbaceous understory averaged 16% cover in 1995 and decreased to 10% in 2005. Perennial grasses sum of nested frequency decreased by 16% in 2005. Bluebunch wheatgrass dominates the grass composition and produced 5% cover in 2005. A sedge and Salina wildrye are also common. Forb production is sparse, even though diversity is moderately high with 23 perennial species encountered in 1995 and 25 in 2005. Most species are low-growing forms with low to medium forage value. The most common species include cryptantha and sulfur eriogonum.

1982 APPARENT TREND ASSESSMENT

Soil trend appears to be in a state of decline. Erosion and soil loss prevent any significant litter buildup and make seedling establishment difficult over much of the area. However, vegetation trend appears more stable. The browse component, although heavily utilized, vigor is fair, and seems to be maintaining itself.

Herbaceous diversity and density are moderately good considering the ongoing erosion. This condition should not be expected to improve without direct management intervention.

1988 TREND ASSESSMENT

Few changes are evident on this high elevation winter range. Ground cover percentages are unchanged and overall soil erosion does not appear as severe as described in 1982. Photograph comparisons indicate an obvious increase in the size and vigor of the key browse species. Data from the density plots show very little increase in true mountain mahogany, although young plants comprise 82% of the population. Black sagebrush has shown the greatest increase and was rated as being moderately hedged as opposed to heavily hedged in 1982. Other browse species provide moderate amounts of forage with their status remaining unchanged. Unpalatable increaser shrubs have not expanded significantly. Trend for browse is considered stable. Grass abundance has increased largely due to an increase in Salina wildrye from a quadrat frequency of 1% to 36%. Quadrat frequency of bluebunch also increased from 55% to 82%. Sixteen species of forbs were found, yet their density remains relatively low.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - stable (0)

1995 TREND ASSESSMENT

Trend for soil is stable. Even though percent bare ground has increased slightly, there appears to be no movement of soil and bare ground is still below 10%. Trend for browse is stable with reduced heavy use, good vigor and low decadency rates of the preferred browse species (true mountain mahogany, serviceberry and black sagebrush). Unpalatable increasers do not appear to have expanding populations. Trend for the herbaceous understory appears slightly up with substantial increase in sum of nested frequency for perennial grasses and forbs. The Desirable Components Index rated this site as good with a score of 83 due to excellent browse cover and good perennial grass and forb cover.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - slightly up (+1)
winter range condition (DC Index) - good (83) High Potential scale

2005 TREND ASSESSMENT

The trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground improved. The relative cover of both litter and bare ground changed little. The trend for browse is slightly down. The key browse species include true mountain mahogany and black sagebrush. The mountain mahogany population is stable with an increase in utilization from moderate to heavy. The percentage of decadent and of dying individuals are both low. The density of black sagebrush decreased 36% from 1995 to 2005. The decadent individuals increased from 12% in 1995 to 41% in 2005. Dying increased from 5% to 32% of the population and those with poor vigor increased from 8% to 34%. The utilization decreased from 67% moderate use in 1995 to 22% in 2005. Although this large dieoff of black sagebrush will influence the overall browse component, it is evident from the utilization numbers that mahogany is compensating for the losses of black sagebrush browse, as are the other less common preferred browse species. The trend for herbaceous understory is down. The sum of the nested frequencies for perennial grasses and perennial forbs decreased by more than 20%. The overall cover for perennial grasses and perennial forbs also decreased

substantially. The Desirable Components Index rated this site as good to fair with a score of 72 due to excellent browse cover and good perennial grass and forb cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly down (-1)
herbaceous understory - down (-2)
winter range condition (DC Index) - good to fair (72) High Potential scale

HERBACEOUS TRENDS --
Management unit 17 , Study no: 56

Type	Species	Nested Frequency			Average Cover %	
		'88	'95	'05	'95	'05
G	Agropyron spicatum	201	205	197	6.77	4.80
G	Carex sp.	64	104	63	2.45	.92
G	Elymus salina	$_{b}$74	$_{a}$54	$_{a}$40	1.54	1.04
G	Festuca ovina	1	-	-	-	-
G	Koeleria cristata	-	4	7	.06	.06
G	Oryzopsis hymenoides	16	30	29	.57	.92
G	Poa fendleriana	18	11	9	.10	.05
G	Poa secunda	$_{b}$38	$_{a}$6	$_{a}$3	.01	.03
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		412	414	348	11.52	7.85
Total for Grasses		412	414	348	11.52	7.85
F	Antennaria rosea	2	-	5	-	.01
F	Androsace septentrionalis (a)	-	5	7	.01	.01
F	Arenaria sp.	$_{a}$-	$_{b}$13	$_{b}$16	.06	.04
F	Arabis perennans	$_{a}$5	$_{b}$23	$_{a}$11	.07	.02
F	Astragalus argophyllus	$_{ab}$6	$_{b}$15	$_{a}$2	.09	.00
F	Aster chilensis	-	-	8	-	.06
F	Astragalus convallarius	$_{a}$2	$_{ab}$5	$_{b}$10	.01	.06
F	Astragalus tenellus	5	4	3	.01	.00
F	Balsamorhiza sagittata	1	-	-	-	-
F	Caulanthus crassicaulis	-	2	-	.00	-
F	Castilleja flava	$_{a}$7	$_{b}$54	$_{a}$2	.71	.03
F	Calochortus nuttallii	$_{a}$-	$_{b}$9	$_{a}$-	.04	.00
F	Chaenactis douglasii	-	3	-	.00	-
F	Chenopodium leptophyllum(a)	-	2	6	.00	.01
F	Crepis acuminata	$_{a}$-	$_{b}$18	$_{b}$12	.14	.06
F	Cryptantha sp.	$_{a}$19	$_{b}$66	$_{b}$37	.94	.51

Type	Species	Nested Frequency			Average Cover %	
		'88	'95	'05	'95	'05
F	Cymopterus sp.	-	-	3	-	.00
F	Descurainia pinnata (a)	-	4	5	.01	.04
F	Eriogonum alatum	13	23	15	.30	.15
F	Erigeron flagellaris	-	2	2	.03	.03
F	Eriogonum umbellatum	56	68	54	1.33	.55
F	Hymenoxys acaulis	$_{ab}$2	$_{b}$10	$_{a}$-	.24	-
F	Lappula occidentalis (a)	-	3	3	.00	.00
F	Lesquerella sp.	3	-	7	-	.04
F	Lithospermum multiflorum	7	9	9	.18	.27
F	Machaeranthera grindelioides	$_{b}$24	$_{ab}$14	$_{a}$4	.34	.06
F	Orobanche sp.	-	2	-	.00	-
F	Penstemon humilis	$_{b}$92	$_{a}$33	$_{a}$29	.10	.32
F	Petradoria pumila	-	5	-	.01	-
F	Phlox austromontana	-	-	2	-	.03
F	Schoencrambe linifolia	-	4	3	.01	.03
F	Senecio multilobatus	-	2	-	.03	-
F	Unknown forb-perennial	1	-	-	-	-
Total for Annual Forbs		0	14	21	0.02	0.07
Total for Perennial Forbs		245	384	234	4.71	2.33
Total for Forbs		245	398	255	4.74	2.41

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 17 , Study no: 56

Type	Species	Strip Frequency		Average Cover %	
		'95	'05	'95	'05
B	Amelanchier utahensis	31	27	5.11	5.82
B	Artemisia nova	76	47	10.60	3.90
B	Artemisia tridentata vaseyana	7	12	1.09	.04
B	Cercocarpus montanus	76	80	9.68	14.12
B	Chrysothamnus depressus	44	31	.98	1.32
B	Chrysothamnus viscidiflorus viscidiflorus	47	50	2.04	1.87
B	Eriogonum corymbosum	20	11	.31	.41
B	Gutierrezia sarothrae	24	11	.24	.06
B	Pinus edulis	0	1	.18	.15
B	Pseudotsuga menziesii	0	1	-	-
B	Symphoricarpos oreophilus	54	55	3.04	6.15
B	Tetradymia canescens	12	2	.03	.03
Total for Browse		391	328	33.34	33.90

CANOPY COVER, LINE INTERCEPT --
Management unit 17 , Study no: 56

Species	Percent Cover '05
Amelanchier utahensis	7.19
Artemisia nova	3.23
Artemisia tridentata vaseyana	1.79
Cercocarpus montanus	17.43
Chrysothamnus depressus	1.01
Chrysothamnus viscidiflorus viscidiflorus	1.61
Eriogonum corymbosum	.28
Pinus edulis	.28
Pseudotsuga menziesii	.30
Symphoricarpos oreophilus	5.03

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 17 , Study no: 56

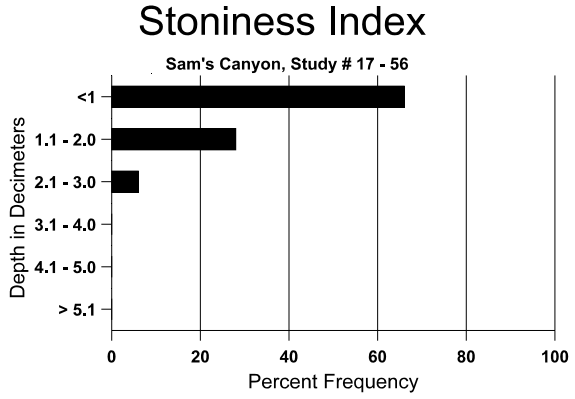
Species	Average leader growth (in) '05
Amelanchier utahensis	5.0
Cercocarpus montanus	5.4

BASIC COVER --
Management unit 17 , Study no: 56

Cover Type	Average Cover % '82	'88	'95	'05
Vegetation	0	6.50	45.45	37.96
Rock	0	1.00	10.33	3.13
Pavement	0	46.00	10.54	24.85
Litter	0	40.25	39.87	41.11
Cryptogams	0	0	.03	.10
Bare Ground	6.50	6.25	9.88	7.67

SOIL ANALYSIS DATA --
Herd Unit 17, Study # 56, Study Name: Sam's Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
13.1	46.2 (14.7)	7.7	38.1	35.4	26.6	4.5	6.9	163.2	0.7



PELLET GROUP DATA --
Management unit 17 , Study no: 56

Type	Quadrat Frequency '95	Quadrat Frequency '05	Days use per acre (ha) '05
Rabbit	6	5	-
Elk	4	24	48 (119)
Deer	25	12	27 (68)
Cattle	-	3	7 (16)

BROWSE CHARACTERISTICS --
Management unit 17 , Study no: 56

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
82	**799**	533	66	733	-	-	17	83	0	-	8	34/29
88	**932**	-	666	266	-	-	36	43	0	-	0	40/35
95	**820**	-	180	620	20	20	22	0	2	-	0	38/50
05	**760**	-	260	440	60	-	29	37	8	3	3	37/46
Artemisia nova												
82	**3199**	200	800	1733	666	-	23	65	21	1	21	9/15
88	**5799**	133	1066	2333	2400	-	48	1	41	.34	1	10/15
95	**4220**	80	440	3260	520	160	67	2	12	5	8	12/21
05	**2680**	440	460	1120	1100	1060	22	4	41	32	34	11/15
Artemisia tridentata vaseyana												
82	**599**	-	200	266	133	-	78	22	22	-	11	19/19
88	**599**	-	333	200	66	-	11	11	11	-	0	11/17
95	**180**	-	60	60	60	20	33	0	33	11	11	17/27
05	**320**	60	80	40	200	100	31	31	63	38	44	18/21
Cercocarpus montanus												
82	**3466**	466	1400	2000	66	-	19	69	2	-	2	23/23
88	**4065**	66	3333	666	66	-	21	62	2	-	0	33/29
95	**2920**	20	380	2540	-	-	55	16	0	-	0	27/31
05	**3120**	20	520	2340	260	40	9	84	8	3	3	31/35
Chrysothamnus depressus												
82	**599**	-	66	533	-	-	67	22	0	-	0	6/8
88	**533**	-	400	133	-	-	0	0	0	-	0	3/6
95	**3080**	-	260	2780	40	-	0	0	1	1	1	6/9
05	**1900**	20	40	1660	200	-	81	7	11	2	2	5/7

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus viscidiflorus												
82	**3598**	-	66	3466	66	-	0	4	2	.55	4	11/9
88	**3666**	-	1266	2200	200	-	0	0	5	-	18	12/12
95	**2520**	-	120	2380	20	-	0	0	1	-	0	34/54
05	**2520**	160	320	2180	20	-	0	0	1	-	0	10/11
Eriogonum corymbosum												
82	**266**	-	-	200	66	-	50	0	25	-	25	12/12
88	**266**	-	200	66	-	-	25	0	0	-	25	10/8
95	**540**	-	20	520	-	-	0	4	0	-	0	10/14
05	**220**	-	-	100	120	20	0	9	55	9	9	13/17
Gutierrezia sarothrae												
82	**333**	-	-	333	-	-	0	0	-	-	0	9/8
88	**600**	-	-	600	-	-	0	0	-	-	0	6/3
95	**840**	-	80	760	-	-	0	0	-	-	0	8/8
05	**300**	20	40	260	-	-	0	0	-	-	0	6/6
Leptodactylon pungens												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	5/6
Pinus edulis												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**20**	-	20	-	-	-	0	0	-	-	0	-/-
Pseudotsuga menziesii												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**0**	-	-	-	-	-	0	0	0	-	0	-/-
05	**20**	-	-	-	20	-	0	100	100	100	100	-/-
Symphoricarpos oreophilus												
82	**3265**	-	1266	1933	66	-	6	0	2	-	0	11/17
88	**4332**	400	3533	666	133	-	11	2	3	-	14	12/16
95	**2500**	40	620	1880	-	-	2	0	0	-	0	11/16
05	**2420**	40	300	1980	140	-	5	0	6	.82	.82	13/23

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Tetradymia canescens												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**460**	-	20	440	-	-	4	0	0	-	0	9/10
05	**40**	-	-	20	20	-	100	0	50	-	0	8/11